

(d) The initial and periodic interference, system check, and calibration test procedures specified in 40 CFR part 1065 may be used in lieu of the procedures specified in this section.

[59 FR 31335, June 17, 1994. Redesignated and amended at 63 FR 56995, 57012, Oct. 23, 1998; 70 FR 40445, July 13, 2005]

**§ 89.322 Carbon dioxide analyzer calibration.**

(a) Prior to its introduction into service, after any maintenance which could alter calibration, and bi-monthly thereafter, the NDIR carbon dioxide analyzer shall be calibrated on all normally used instrument ranges. New calibration curves need not be generated each month if the existing curve can be verified as continuing to meet the requirements of paragraph (a)(3) of this section. Proceed as follows:

(1) Follow good engineering practices for instrument start-up and operation. Adjust the analyzer to optimize performance.

(2) Zero the carbon dioxide analyzer with either zero-grade air or zero-grade nitrogen.

(3) Calibrate on each normally used operating range with carbon dioxide-in-N<sub>2</sub> calibration or span gases having nominal concentrations starting between 10 and 15 percent and increasing in at least six incremental steps to 90 percent (e.g., 15, 30, 45, 60, 75, and 90 percent) of that range. The incremental steps are to be spaced to represent good engineering practice. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less of the value at each non-zero data point and within  $\pm 0.3$  percent of full scale on the zero, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds these limits, the best-fit nonlinear equation which represents the data to within these limits shall be used to determine concentration.

(b) The initial and periodic interference, system check, and calibration test procedures specified in 40 CFR part 1065 may be used in lieu of the procedures in this section.

[59 FR 31335, June 17, 1994. Redesignated and amended at 63 FR 56995, 57012, Oct. 23, 1998; 70 FR 40445, July 13, 2005]

**§ 89.323 NDIR analyzer calibration.**

(a) *Detector optimization.* If necessary, follow the instrument manufacturer's instructions for initial start-up and basic operating adjustments.

(b) *Calibration curve.* Develop a calibration curve for each range used as follows:

(1) Zero the analyzer.

(2) Span the analyzer to give a response of approximately 90 percent of full-scale chart deflection.

(3) Recheck the zero response. If it has changed more than 0.5 percent of full scale, repeat the steps given in paragraphs (b)(1) and (b)(2) of this section.

(4) Record the response of calibration gases having nominal concentrations starting between 10 and 15 percent and increasing in at least six incremental steps to 90 percent of that range. The incremental steps are to be spaced to represent good engineering practice.

(5) Generate a calibration curve. The calibration curve shall be of fourth order or less, have five or fewer coefficients. If any range is within 2 percent of being linear a linear calibration may be used. Include zero as a data point. Compensation for known impurities in the zero gas can be made to the zero-data point. The calibration curve must fit the data points within 2 percent of point.

(6) Optional. A new calibration curve need not be generated if:

(i) A calibration curve conforming to paragraph (b)(5) of this section exists; or

(ii) The responses generated in paragraph (b)(4) of this section are within 1 percent of full scale or 2 percent of point, whichever is less, of the responses predicted by the calibration curve for the gases used in paragraph (b)(4) of this section.

(7) If multiple range analyzers are used, the lowest range used must meet the curve fit requirements below 15 percent of full scale.

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**§ 89.324 Calibration of other equipment.**

(a) Other test equipment used for testing shall be calibrated as often as